

# (12) UK Patent Application (19) GB (11) 2 334 488 (13) A

(43) Date of A Publication 25.08.1999

(21) Application No 9803523.1

(22) Date of Filing 20.02.1998

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(51) INT CL<sup>6</sup>

B60R 21/08

(52) UK CL (Edition Q)

B7B BHD BSBCX B28Y B287

(56) Documents Cited

GB 2286564 A	GB 2278812 A	GB 1320595 A
US 5707075 A	US 5660414 A	US 4906020 A
US 4586223 A	US 3666313 A	US 2806737 A

(58) Field of Search

UK CL (Edition P) B7B BHC BHD BHL BSBCR BSBCX

BSBNC

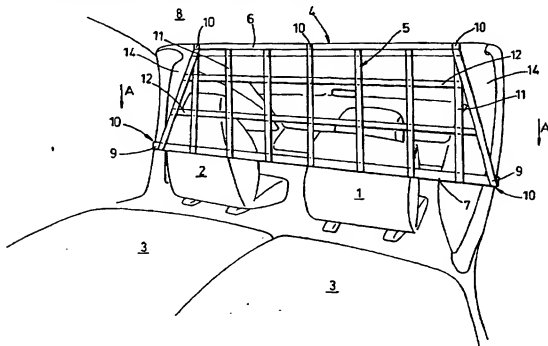
INT CL<sup>6</sup> B60R 21/02 21/06 21/08 21/12 21/16

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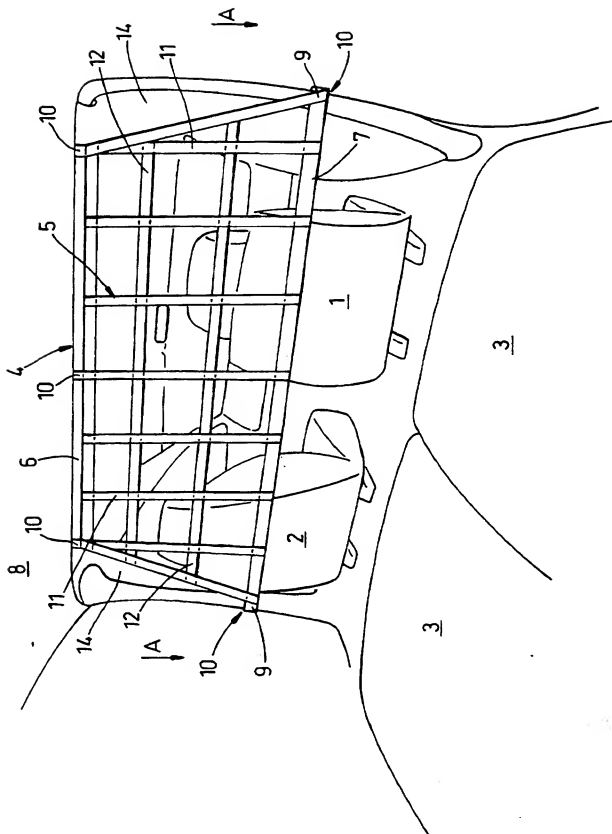
(54) Abstract Title

A safety barrier arrangement

(57) A safety barrier arrangement (4) is arranged within a motor vehicle to be deployed from a panel edge position (6) within a motor vehicle roof lining (8) to a displaced edge (7) positioned such that a barrier element (5) therebetween presents an effective surface resistant to percussive penetration therethrough. The barrier element (5) is deployed typically along rail or channel elements located within vertical posts of a motor vehicle located behind seating (1, 2, 3) of that vehicle. Thus, luggage from the luggage compartment of the motor vehicle cannot collide with occupants of such seating (1, 2) within the motor vehicle after deployment of the safety barrier arrangement (4). The barrier element (5) may be a net or mesh or a sheet or strips of material appropriately secured between the panel edge (6) and the displaced edge (7). Normally, the deployment means to propel the displaced edge (7) will be a pyrotechnic device to force ends (9) of the edge (7) into engagement with latch elements (10) within the rail or channel.



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A SAFETY BARRIER ARRANGEMENT

The present invention relates to a safety barrier arrangement for use within a motor vehicle.

It is known to provide rigid gate-like structures secured about the rear bench seat squab or the rear quarter trim panel such that the passenger  
5 portion of the motor vehicle passenger cabin is protected from luggage or dogs held on the other side of the barrier. Thus, the barrier divides the luggage storage area of the motor vehicle from the passenger cabin and, in terms of safety, prevents heavy luggage items moving forward during rapid deceleration and accidents. The passengers within the motor vehicle are  
10 thereby protected from injury as a result of collision with these heavy luggage items.

These previous barriers are generally fitted either as a tubular gauge structure or simply nets secured as a roller blind. However, and as indicated above, the barrier is secured to the back of the seat squab or the  
15 rear quarter trim panel.

In accordance with the present invention there is provided a safety barrier arrangement for a motor vehicle, the barrier arrangement comprising a barrier element coupled to deployment means, said barrier element being secured to a panel edge and said deployment means being

configured to present, upon activation, said barrier element between said panel edge and a deployed edge displaced from said panel edge, said deployed edge being part of said barrier element so that said barrier element between said panel edge and said deployed edge constitutes an effective barrier to substantially prevent percussive penetration therethrough.

The barrier element may be secured within a container and said container may constitute said panel edge. The container may include a cover which is ruptured or displaced upon deployment of said barrier element by said deployment means.

The panel edge may be located within a roof liner or high liner panel of a motor vehicle substantially above the seating therein.

The deployment means may comprise a rail or a channel along which the barrier element is propelled by propellant means from said panel edge to said displaced position of said deployed edge. The propeller means may be a compressed gas or a solid propellant material. The channel or rail may be located within the B or C posts of a motor vehicle between its doors. The rail or channel means may be concealed by a fascia rupturable or displaceable upon deployment of said barrier element by said deployment means.

The barrier element may be a net or a sheet or a mesh or suitably arranged strips of material, ie. overlapping or adjacent each other. The barrier element may be folded or rolled about said panel edge prior to deployment. The barrier element may be reinforced by spar elements  
5 inflated possibly by the deployment means compressed gas or expansion of gas from said solid, ie. pyrotechnic, propellant of said propellant means.

Activation of the deployment means will be automatic. Automatic deployment may be linked to activation of other safety features within a motor vehicle such as its air bag system.

10 The safety apparatus within the motor vehicle is a one shot device without a reset capability, ie. rupturing of the container cover and any fascia to the channel means would require replacement of these components rather than resetting.

An embodiment of the present invention will now be described, by way  
15 of example only with reference to an accompanying drawing, in which a pictorial representation of a motor vehicle interior is depicted.

Referring to the drawing of a pictorial representation of a motor vehicle interior. A driver's seat 1 and a front passenger seat 2 are illustrated in conventional configuration. Rear seating 3 may be configured in its normal

configuration to allow passengers to sit on the seating 3 or folded down to provide an enlarged luggage space. In the embodiment depicted in the drawing, a safety barrier arrangement 4 is positioned to provide protection for the occupants of the front seats 1, 2.

5       As depicted the safety barrier arrangement 4 comprises a barrier element 5 secured to a panel edge 6 and having a deployed edge 7. As illustrated, the barrier element 5 can be a net. However, it will be understood by those skilled in the art that a sheet of material or a mesh or appropriately located strips of material could be used. The objective of the  
10 barrier element 5 is to provide a barrier surface which substantially prevents percussive penetration therethrough whilst being collapsible for easy stowage prior to deployment.

In order to provide a surface that is resistant to percussive penetration, the barrier element 5 must be made from suitably resilient materials.  
15 Thus, the element 5 may be made from webbing or canvas or plastics materials. In addition to being made of suitably robust materials, the element 5 must be able to retain a taut aspect with regard to any percussive attack. Thus, the deployed edge 7 must be both robust in terms of mechanical strength and anchoring such that the barrier element 5 between  
20 the panel edge 4 and the deployed edge 7 provides a sufficiently resistive surface.

The panel edge 4 is normally associated with a roof liner or high liner 8 of a motor vehicle. Thus, typically, the panel edge 4 will comprise a recessed container (not shown) to contain the barrier element 5 when stowed, ie. collapsed. This container will typically include a cover which  
5 will be displaced or ruptured upon deployment of the barrier element 5. Thus, such a cover will have a pre-stressed line or break in the headliner such that, upon deployment, the element 5 will be forced therethrough.

It will be appreciated that the barrier arrangement 4 in accordance with the present invention could be a simple one off safety device. As a one  
10 off safety device, the arrangement 4 requires rapid deployment and as such the element 5 will be propelled by an appropriate deployment mechanism such that the deployed edge 7 is held at a sufficiently displaced position relative to the panel edge 4 to provide the described percussive penetration resistant surface. Deployment of the barrier arrangement 4 could be linked  
15 to appropriate violent deceleration of a motor vehicle and may be coterminously triggered with any air bag arrangements within the motor vehicle to supplement any protective cocoon for occupants of the motor vehicle.

An example of a suitable one off safety deployment mechanism would  
20 use a pyrotechnic device to drive the deployed edge 7 downwards in the direction of arrow heads A. Ends 9 of the deployed edge 7 would be

associated with rail or channel elements (not shown) within the motor vehicle in order to guide the edge 7 downwards (arrowheads A). At the desired displaced position for the edge 7 there would be appropriate detent latching for the ends 9. Such latching could comprise constrictions in the rail or channel elements such that the pyrotechnic force of the deployment mechanism forces the edge 7 along with ends 9 beyond such constriction but the reciprocal elastic response of the element 5 is insufficient to return the ends 9 back beyond the constriction. Thus, the barrier 7 will be held at the displaced position about such a constriction in the elements. It will be appreciated that the displaced position chosen will be a compromise between sufficiency of protection and rapidity of deployment. In such circumstances it will be understood that, as illustrated in the drawings, the displaced position of the deployed edge will be generally intermediate between the roof of a motor vehicle and its floor well.

15       It will be appreciated that the barrier element 5 once deployed may obstruct the activities of emergency services attempting to assist a driver within a motor vehicle and so the barrier element 5 in its deployed state is preferably easily removed to facilitate more complete access to the motor vehicle occupant. Thus, the principal anchor points 10 of the element 5 will  
20       normally be easily released from the panel edge 6 and guide channel element to allow easy removal of the element 5.



To summarise the barrier arrangement depicted in the drawing, it will be appreciated that the barrier arrangement 4, prior to deployment, will be contained behind the head liner 8 of the motor vehicle with retention at points 10 in the B/C posts of a motor vehicle between its front and rear doors either side. Upon deployment, ie. with the air bag arrangements of the motor vehicle, either a mechanical actuator or a pyrotechnic propellant device is initiated and this will draw the barrier element 5 from its location behind the head liner 8 in the downward direction depicted by arrowheads A. Typically, as described above, the element 5 will be located within a container whose cover is prestressed or fabricated such that it is forced open by the deployment mechanism pulling the element 5 under tension down in the direction A. With the barrier element 5 fully deployed, it will be appreciated that the net of the element 5 prevents items of luggage contained in the rear load space moving forwards and colliding with the vehicle's occupants during rapid deceleration. The element 5 can be a net or a plain sheet of material. However, it will be appreciated that if a net is used consideration must be made of the net dimensions to ensure luggage items or other potential sources of percussive penetration are contained by the barrier 5.

Mechanical strength for the element 5 must be significant along with a degree of elasticity in order to provide the necessary shock absorption of any percussive collision with the element 5. Thus, the panel edge 6 will

normally be relatively rigid, whilst the deployed edge 7 may be relatively flexible or similarly rigid to provide, under tension, a sufficiently resilient barrier surface created by the element 5 when deployed. Furthermore, utilisation may be made of any pyrotechnic device or compressed gas to  
5 create reinforcement of the barrier 5 through respective vertical spar 11 and/or horizontal spars 12 being inflated by such devices. As with air bag arrangements within a motor vehicle, such inflation of the spars 11, 12 will be transient but, during that transient condition, significant additional resilience may be provided within the barrier element 5 sufficient to protect  
10 the motor vehicle occupants.

It will be appreciated that, in order to appropriately locate the element 5 within the motor vehicle, it may be necessary to provide valance or gusset-type elements 14 about either end of the element 5 in order to achieve the necessary strength during rapid deployment of the element 5 through  
15 pyrotechnic or other relatively violent propulsion. This gusseting 14 will allow controlled but forceful deployment of the element 5 without potential rip detachment of the ends 9 due to momentum lag as the ends 9 are propelled by the propulsive force.

In a net or mesh configuration the barrier element 5 will generally be  
20 formed from webbing or canvas strips appropriately sewn or adhered together to create the net or web. However, the element 5 could comprise

juxtaposed, adjacent or overlapping strips of material to create the necessary percussive resistant barrier surface.

CLAIMS

1. A safety barrier arrangement for a motor vehicle, the barrier arrangement comprising a barrier element coupled to a deployment means, said barrier element being secured to a panel edge and said deployment means being configured to present upon activation said barrier element between said panel edge and a deployed edge displaced from said panel edge, said deployed edge being part of said barrier element so that said barrier element between said panel edge and said deployed edge constitutes an effective barrier to prevent percussive penetration therethrough.
2. An arrangement as claimed in Claim 1, wherein said barrier element is secured within a container and said container substantially constitutes said panel edge.
3. An arrangement as claimed in Claim 2, wherein said container includes a cover which is rupturable or displaceable upon deployment of said barrier element by said deployment means.
4. An arrangement as claimed in Claim 1, 2 or 3, wherein said panel edge is a portion of a motor vehicle roof liner.

5. An arrangement as claimed in any preceding claim, wherein said deployment means comprises rail or channel means along which said barrier element is propelled by propulsion means from said panel edge to said displaced position of said deployed edge.
6. An arrangement as claimed in Claim 5, wherein said propeller means is a compressed gas or a solid pyrotechnic propellant substance.
7. An arrangement as claimed in Claim 5 or Claim 6, wherein said channel or rail means is located within the respective vertical posts of a motor vehicle between said front and rear doors thereof.
8. An arrangement as claimed in Claim 5, 6 or 7, wherein said channel or rail means is concealed by a fascia rupturable or displaceable upon deployment of said barrier element by said deployment means.
9. An arrangement as claimed in any preceding claim, wherein said barrier element is a net or a sheet or a mesh or strips of material configured to provide an effective barrier to prevent percussive penetration through said barrier element.
10. An arrangement as claimed in any preceding claim, wherein said barrier element is reinforced by inflation of spar elements within said

barrier elements upon deployment of said barrier element by said deployment means.

11. An arrangement as claimed in any preceding claim, wherein said deployment means is activated along with an air bag safety arrangement of a motor vehicle upon detection of a predetermined rate of deceleration for an associated motor vehicle thereto.



Application No: GB 9803523.1  
Claims searched: 1 to 11

Examiner: Karl Whitfield  
Date of search: 10 August 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): B7B (BHC, BHD, BHL, BSBGR, BSBGX, BSBNC)

Int Cl (Ed.6): B60R 21/02, 21/06, 21/08, 21/12, 21/16

Other: Online database: Derwent World Patents Index accessed via Questel

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2278812 A (HONDA)	1-4, 9 & 10
X	GB 2286564 A (AUTOLIV)	1, 2, 4 & 9
X	GB 1320595 (ALLIED CHEMICAL)	1 & 4-7
X	US 5707075 (KRAFT et al.)	1, 9 & 11
X	US 5660414 (KARLOW et al.)	1-9
X	US 4906020 (HABERER)	1, 4 & 9
X	US 4588223 (LEDENYI)	1-3, 5, 6 & 9
X	US 3666313 (HALSTEAD et al.)	1, 5 & 9
X	US 2806737 (MAXWELL)	1, 2 & 4

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.